Attachment 8 **Benefits and Costs Analysis**
14th Street Storm Water Collection and Integration Basin Project

Water Supply Benefit

Based on past rainfall data, the proposed project, upon completion, will capture approximately 400 AF of storm water per year for recharge, which is for ground water production at a later date instead of purchasing imported water from Metropolitan Water District (MWD) of Southern California. The savings due to this "avoidance" can be calculated as below.

Benefit Analysis for the Upland's 14th Street Collection/Recharge Basin

MWD Full Service Untreated Rates Established for 2012 and 2013

	2012	2013	Avg. of 2012-13
Tier MWD 1 Rate	$560.00	$593.00	$576.50
Tier MWD 2 Rate	$686.00	$743.00	$714.50
Avg. of Each Year	**$623.00**	**$668.00**	**$645.50**
Captured Volume [AFY] (a)	400	400	400
Value [$] (b)	$249,200	$267,200	$258,200
Project Life [Year]	50	50	50
(Imported Water Purchase) Savings [$](c)	$12,460,000	$13,360,000	$12,910,000
Project Cost [$]	$5,000,000	$5,000,000	$5,000,000
Benefit-To-Cost Ratio (d)	2.5	2.7	**2.6**

Note
(a) Based on past records of rainstorm data and basin area
(b) Value = Captured Volume x Avg. of MWD Tier 1 and 2 rate
(c) Savings = Value x Project Life
(d) Benefit-To-Cost Ration = Savings / Project Cost

The above benefit-to-cost ratio is positioned to be higher in the future, due to the constant increase of MWD rate as evidenced historically.

In addition, the storm water captured can also serve as a blending source for future recycled water recharge implementation (if so desired). At a 50/50 blending ratio, 400 AFY of recycled water can be utilized, thus further reducing the MWD imported volume by 400 AFY (for a total of 800 AFY). The recycled water recharge most likely increases the benefit-to-cost ratio; however, it is premature to determine at this time as it involves recycled water rate and construction cost of recycled water supply line.

Flood Damages Avoidance Benefit Determined by DWR Method

Based on the DWR method of calculating the Present Value of Expected Annual Damage Benefits outlined in Table 12 of the application guideline, the City estimates the proposed project has an annual benefit of $279,196 or $4.67 million during the project life.

Table 12 - Present Value of Expected Annual Damage Benefits			
Project: 14th Street Storm Water Collection/Integration Project			
(a)	Expected Annual Damage Without Project (1)		$279,196
(b)	Expected Annual Damage With Project (1)		$0
(c)	Expected Annual Benefit	(a) - (b)	$279,196
(d)	Present Value Coefficient (2)		17
(e)	**Present Value of Future Benefits Transfer to Table 17, column (d).**	(c) x (d)	**$4,665,361**

(1) This program assumes no land use changes in the floodplain. So, the expected annual damage (EAD) will be constant over analysis period. Please refer to the attached tables (Table 9, 10 and 11) for calculation of $279,196.

Other Environmental/Water Resource Benefits

There are valuable benefits associated with water resources management goals mentioned in Attachment 3. Those benefits fit in the benefit criteria listed in Table 8 of the Grant Guidance Application. These benefits are difficult to be quantified; however, they are real, not only for the City but also to the Santa Ana watershed region.

Summary of Benefits

Summary Quantified Benefits		**Value/Year**
Water Supply	Imported Water Purchase Savings	**$258,200**
Water Quality	Difficult to quantify	
Ecosystem Improvement	Difficult to quantify	
Recreation & Public Access	Difficult to quantify	
Power Cost Savings and Power Production	Elimination of CO2 emission (1) [Metric Ton of CO2]	**690**
Reduction in Flood Damage Cost	Avoidance Cost for emergency response and damage due to flood damages	**$279,196**

(1) According to the Natural Resource Defense Council, pumping 1 ac-ft of State Water Project water to southern California requires 3,000 kWh and pumping 1 ac-ft of Colorado River Aqueduct water to the region requires about 2,000 kWh. As a result, using both sources, on average, requires 2,500 kWh for 1 ac-ft volume. The EPA estimated an emission factor of 6.8956 x (10^(-4)) metric tons CO2 per kWh. Therefore, for 400 ac-ft per year, the proposed Basin will eliminate 690 metric tons of CO2 each year.